

WHAT IS CLAIMED IS:

1 1. A diagnostic apparatus for examining a heating, ventilation,
2 and air conditioning (HVAC) system, said apparatus comprising:

3 a control unit detachably connected to the HVAC system, said
4 control unit controlling a plurality of control parameters of the HVAC
5 system; and

6 means for said control unit to monitor a plurality of performance
7 characteristics of the HVAC system;

8 whereby said control unit monitors the plurality of performance
9 characteristics while controlling the HVAC system to provide a
10 diagnostic check of the HVAC system.

1 2. The diagnostic apparatus of claim 1 wherein said control
2 unit controls a plurality of control parameters through a plurality of
3 control function activators providing control functions to the HVAC
4 system.

1 3. The diagnostic apparatus of claim 2 wherein said control
2 function activators provide control functions directly to the HVAC
3 system.

1 4. The diagnostic apparatus of claim 1 wherein said control
2 unit controls a plurality of control parameters as a control system
3 separate from internal controls of the HVAC system.

1 5. The diagnostic apparatus of claim 1 wherein said control
2 unit controls a plurality of control parameters through an internal control
3 system associated with the HVAC system.

1 6. The diagnostic apparatus of claim 1 wherein said control
2 unit includes a visual indication of at least one properly functioning
3 control circuit associated with at least one of the plurality of control
4 parameters of the HVAC system.

1 7. The diagnostic apparatus of claim 1 wherein said control
2 unit includes means for variably controlling at least one control
3 parameter of the HVAC system.

1 8. The diagnostic apparatus of claim 7 wherein said variable
2 control means is a pulse width adjuster.

1 9. The diagnostic apparatus of claim 7 wherein said variable
2 control means is a variable voltage threshold (V_{th}) function adjuster.

1 10. The diagnostic apparatus of claim 1 wherein said means for
2 said control unit to monitor a plurality of performance characteristics of
3 the HVAC system includes a display providing a graphical representation
4 of at least one performance characteristic.

1 11. The diagnostic apparatus of claim 1 wherein said control
2 unit is powered from a power source separate from any power source
3 powering the HVAC system.

1 12. The diagnostic apparatus of claim 1 wherein said control
2 unit is powered by a power source powering the HVAC system.

1 13. The diagnostic apparatus of claim 1 wherein said control
2 unit connected to the HVAC system with a first cable extending from
3 said control unit to a control system of the HVAC system and a second
4 cable connecting said control unit to a motor driving the HVAC system.

1 14. The diagnostic apparatus of claim 1 wherein said monitoring
2 means of a plurality of performance characteristics includes monitoring
3 a voltage associated with the HVAC system.

1 15. The diagnostic apparatus of claim 1 wherein said monitoring
2 means of a plurality of performance characteristics includes monitoring
3 a revolution per minute count of a motor driving the HVAC system.

1 16. The diagnostic apparatus of claim 1 wherein said monitoring
2 means of a plurality of performance characteristics includes monitoring
3 a Y and G threshold voltage.

1 17. The diagnostic apparatus of claim 1 wherein said control
2 unit includes a PWM duty cycle generator.

1 18. An apparatus for examining a heating, ventilation, and air
2 conditioning (HVAC) system, said apparatus comprising:

3 a portable control unit detachably coupled to the HVAC system,
4 said control unit monitoring a plurality of performance characteristics
5 associated with a plurality of control parameters controlling the HVAC
6 system; and

7 means for controlling the HVAC system within the portable
8 control unit through the plurality of control parameters of the HVAC
9 system;

10 whereby said control unit monitors the plurality of performance
11 characteristics while controlling the HVAC system to determine a status
12 of the HVAC system.

1 19. The diagnostic apparatus of claim 1 wherein:
2 the HVAC system includes a control system controlling a motor
3 within the HVAC system; and
4 said control unit includes a selectable switch, said switch allowing
5 said control unit to operate in a first mode to monitor a plurality of
6 interconnected functions between the HVAC system and the motor and
7 a second mode to disconnect the control system from operating and
8 controlling the motor;
9 whereby switching between the first mode and the second mode
10 provides means for isolating a location of a malfunction occurring within
11 the HVAC system.

1 20. A diagnostic apparatus for examination of a heating,
2 ventilation, and air conditioning (HVAC) system, said apparatus
3 comprising:

4 a control unit having connecting means to the HVAC system, said
5 control unit controlling a plurality of control parameters of the HVAC
6 system through a plurality of control function activators providing
7 control functions to the HVAC system, said control unit variably
8 controlling at least one control parameter; and

9 means for said control unit to monitor a plurality of performance
10 characteristics of the HVAC system;

11 whereby said control unit monitors the plurality of performance
12 characteristics while controlling the HVAC system to provide a
13 diagnostic check of the HVAC system.